Remarks

The Applicants have cancelled Claims 1-11 and amended Claims 12-15. Claims 12-15 have been amended to remove "about" with respect to the 48% or larger total elongation. Claim 13 now recites that the amount of C present in the steel is 0.05% or less and the amount of Ni is 0.9% or less. Support may be found in paragraphs [0059] and [0143]. Entry into the official file and consideration on the merits is respectfully requested. Claims 12, 14 and 15 are amended to correct typographical errors.

The objection with respect to cancelled Claim 1 is moot. Withdrawal of the rejection is respectfully requested.

Claims 1, 3, 4, 6-12, 16 and 18-20 stand rejected under 35 USC §103 over the hypothetical combination of Durand-Charre with Alfonsson. The portion of the rejection directed to Claims 1, 3, 4 and 6-11 is now moot in view of the cancellation of those claims. Claims 14 and 15 stand rejected under 35 USC §103 over Alfonsson alone. The Applicants note with appreciation the Examiner's detailed comments hypothetically applying Alfonsson alone and in combination with Durant-Charre against those claims.

Those rejections seek "objective evidence" showing that the steels of Alfonsson possess different properties from those claimed. The Applicants respectfully submit that there is no need for additional objective evidence since such objective evidence is already present on this record. In that regard, the Applicants invite the Examiner's attention to Table 2 of Alfonsson just below paragraph [0043]. That table contains elongation percentages resulting from a tensile test. Those elongation percentages are 46, 44, 46, 42, 39 and 36.

On the other hand, the Applicants specifically claim that their steels have a total elongation of 48% or more when determined by a tensile test. Thus, the Applicants respectfully

submit that objective evidence is already present on this record and is quite compelling. The Alfonsson steels have elongation percentages in a range of 36-40%, while the Applicants' claimed steels have an elongation of about 48% or more. The Applicants respectfully submit that such clear differences in the steels confirms their position as set forth in the Response dated June 12, 2009 that differences in compositions and methods of making the steels can result in important differences in physical characteristics. Those physical characteristics and their differences are now objectively identified on the record. However, the Applicants provide more objective evidence.

Alfonsson discloses securing a preferred two-phase structure (ferrite phase of 35 vol% to 65 vol%), the Cr and Ni equivalents and the definition of the composition of each element in paragraph [0032]. Alfonsson also discloses that good performance is preferably secured in a range of a trapezoid surrounded by A-B-C-D-A, still more preferably in a range surrounded by D-E-F-G-H-D, in Fig. 1. On the other hand, the Applicants' Claim 12 provides an austenitic-ferritic stainless steel sheet having high formability which is provided with excellent ductility and deep drawability.

Attached Fig. A is a diagram wherein Steel Nos. 30 to 36 concerning Claim 12, tabulated in Table 1 of the Applicants' Specification, are superimposed on Fig. 1 of Alfonsson. Numerals in Fig. A are the values of Md (γ). Md (γ) tends to increase in the direction of an arrow, drawn in Fig. A, and Md (γ) is specified as -30 to 90 in Claim 12. The basis of the calculation is shown in attached Table D.

Attached Fig. A contains Examples of Claim 12 (wherein Md (γ) : -30 to 90 and total elongation: 48% or more) which are apparently outside the preferable range (A-B-C-D-A) disclosed in Alfonsson. Obtaining a total elongation of 48% or more is also not suggested. Total

elongation in the preferable range (D-E-F-G-H-D) as disclosed in Alfonsson will be 42% to 46% at the most, as tabulated in Table 2.

Alphonsson discloses that steel of good performance is preferably secured in a range of a trapezoid surrounded by A-B-C-D-A, still more preferably in a range surrounded by D-E-F-G-H-D, in Fig. 1. On the other hand, the Applicants' Claim 14 provides an austenitic-ferritic stainless steel which has excellent corrosion resistance of welded parts at a relatively low cost while saving Ni resources.

Attached Fig. B is a diagram wherein Steel Nos. 12 to 29, concerning Claim 14, tabulated in Table 1 of the Applicants' Examples are superimposed on Fig. 1 of Alfonsson. Numerals in Fig. B are the values of Md (γ). Md (γ) tends to increase in the direction of an arrow, drawn in Fig. B, and in the Applicants' Claim 14, Md (γ) is specified as -30 to 90. The basis of the calculation is shown in attached Table D.

Attached Fig. B shows that Examples of Claim 14 (wherein Md (γ) : -30 to 90 and total elongation: 48% or more), except Md (γ) = -29 (Steel No. 19), are apparently outside the preferable range (A-B-C-D-A) disclosed in Alfonsson. Obtaining a total elongation of 48% or more also is not taught or suggested. Total elongation in the preferable range (D-E-F-G-H-D) set forth in Alfonsson will be 42% to 46% at the most, as tabulated in Table 2.

Alfonsson discloses that good performance of steel is more preferably secured in a range of a trapezoid surrounded by A-B-C-D-A, still more preferably in a range surrounded by D-E-F-G-H-D, in Fig. 1. On the other hand, the Applicants' Claim 15 provides an austenitic-ferritic stainless steel which has excellent corrosion resistance.

Attached Fig. C is a diagram wherein Steel Nos. 5 to 11, concerning Claim 15, tabulated in Table 1 of the Applicants' Examples, are superimposed on Fig. 1 of Alfonsson. Numerals in

Fig. C are the values of Md (γ). Md (γ) tends to increase in the direction of an arrow, drawn in Fig. C, and in the Applicants' Claim 15, Md (γ) is specified as -30 to 90. The basis of calculation is shown in attached Table D.

Attached Fig. C shows Examples of Claim 15 (wherein Md (γ) : -30 to 90 and total elongation: 48% or more) which are apparently outside the preferable range (A-B-C-D-A) disclosed in Alfonsson. Obtaining total elongation of 48% or more also is not taught or suggested. Total elongation of 48% or more also is not taught or suggested. Total elongation in the preferred range (D-E-F-G-H-D) as disclosed in Alfonsson will be 42% to 46% at the most, as tabulated in Table 2.

To obtain high elongation (48% or more) as recited in the Applicants' Claims 12, 14 and 15 and the two-phase stainless steel, optimization of Md (γ), which is calculated from γ phase component, is necessary. Md (γ) acts as an index of the strain-induced martensite which is generated when steel is deformed and the strain-induced martensite apt to be formed as Md (γ) is higher whereas the strain-induced martensite apt to be hardly formed as Md (γ) becomes low.

The component of the γ phase is influenced by a final heat treatment temperature, besides the influence from steel component and, therefore, the γ phase component is not decided from steel component only as the source of the influence. When the final heat treatment temperature is constant, Cr eq. component and Ni eq. component in the γ phase become low, as the Cr eq. component and Ni eq. component in the steel become low. By the decrease of Cr eq. component and Ni eq. component in the γ phase, Md (γ) increases and the strain-induced martensite during deformation increases. That is to say, when heat treatment temperatures are the same and the α / γ phrase ratios are constant, the Md (γ) is considered to increase as it goes down to the lower left side in Figs. A to C.

Alfonsson specifies the amounts of Cr equivalent and Ni equivalent to obtain a preferable two-phase structure, but this is a condition to achieve a ferrite phase of 35 to 65% (an austenite phase of 35 to 65%) and Alfonsson does not disclose, teach or suggest a γ phase component for obtaining high elongation or the Md (γ) which shows stability of a γ phase. The Examples of Alfonsson are limited within a range (D-E-F-G-H-D) and that range is different from a range which shows high elongation. Claims 12, 14 and 15 are directed not only to the amont of an austenite phase, but also the quality (stability of phase defined by Md (γ) of an austenite phase and are substantially different in the matter of design concept of steel from that of Alfonsson. Withdrawal of both of the rejections based on Alfonsson is respectfully requested.

Claims 1-3 and 5 stand rejected under 35 USC §103 over the hypothetical combination of Durand-Charre with Matsui. That rejection is now moot in view of the cancellation of those claims.

Claim 13 stands rejected under 35 USC §103 over Matsui alone. The Applicants again note with appreciation the Examiner's helpful comments.

Matsui relates, as set forth in paragraph [0001], to the secondary combustion chamber cap for diesel power plants excellent in high temperature strength, heat-resistant fatigue characteristics, and high-temperature-deformation-proof characteristics.

On the other hand, the Applicants' Claim 13 provides an austenitic-ferritic stainless steel sheet having concurrently high punch stretchability and crevice corrosion resistance, while curtailing the amount of Ni. The range of Mn specified in Claim 13 is 2% or less. Paragraph [0059] of the Applicants' Specification states that, in view of improvement in the stress corrosion cracking resistance, the C content is preferably 0.05% or less. Further, in paragraph [0143], the Applicants state that the Ni content is limited to 0.9% or less to secure punch

stretchability and from the viewpoint of economy and resource-saving. Further, Claim 13 does not require the addition of W and Zr, as are required as indispensable elements by Matsu.

On the other hand, Matsui requires a C content in a range of 0.06% to 0.2% while the Ni content as 1 to 8%. These amounts are quite different from the range specified in Claim 13. Also, the addition of W: 0.1 to 2.5% and Zr: 0.002 to 0.1% disclosed therein also is an indispensable condition.

Therefore, the ranges of C and Ni defined in Claim 13 are dissimilar to the ranges of C content and Ni content disclosed in Matsui. Moreover, Claim 13 does not require the addition of W and Zr, as are required as indispensable elements by Matsui. Furthermore, there are differences in the objects and effects between Claim 13 and Matsui.

The Matsui disclosure is no more relevant to the above rejected claims than Alfonsson. In fact, the Applicants respectfully submit that Matsui is further afield than Alfonsson. Withdrawal of both rejections is respectfully requested.

In light of the foregoing, the Applicants respectfully submit that the entire Application is now in condition for allowance, which is respectfully requested.

Respectfully submitted,

T. Daniel Christenbury
Reg. No. 31,750
Attorney for Applicants

TDC/vp
(215) 656-3381

Fig. A

Present application, Cl.12…Ni:1.22～3, Mn≦10, Si≦4
Overlaping with Alfonsson in claims and compositions

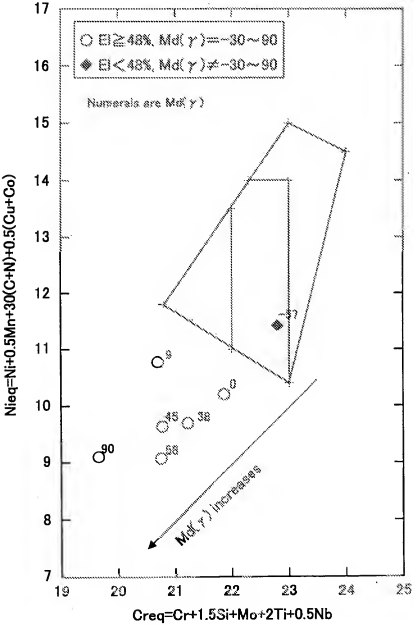

Fig. B

Present application Cl.14...Ni≦1, Mn:4.1～12, Si≦1.2

Overlaping with Alfonsson in claims and compositions

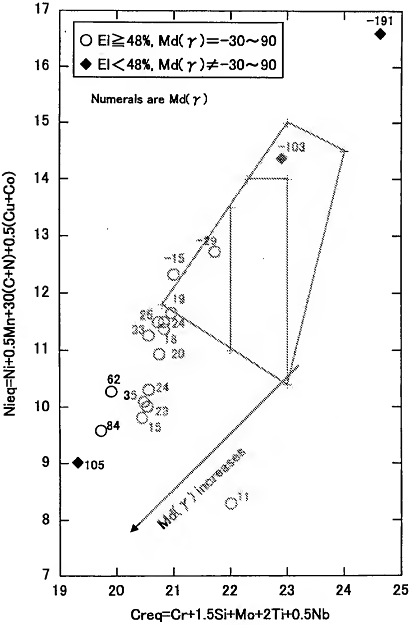

Fig. C

Present application Cl.15...Ni≦1, Mn:2~4, Si≦0.38
Overlaping with Alfonsson in claims and compositions

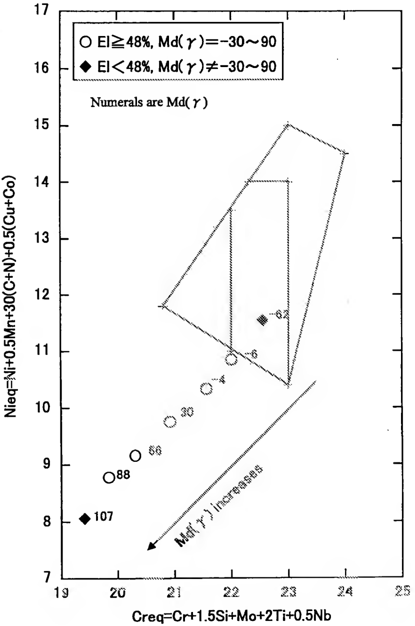

Table D

2004S01504

Creq & Nie (Alfonsson equation), calculated from Examples of present invention (steel composition)

Creq=Cr+1.5Si+Mo+2Ti+0.5Nb, Nieq=Ni+0.5Mn+30(C+N)+0.5(Cu+Co)

		From Table 1 of present application (mass%)										Creq. & Nieq of Alfonsson		From Table 2 of present application	
		No.	C	N	Si	Mn	P	S	Cr	Ni	Cu	Mo	Creq	Nieq	Md(γ)	El
Example of invention	Cl.13 Ni≦1% Mn≦2% Si≦1.2%	1	0.007	0.22	0.07	0.04			23.72	0.01	0.00	0.00	23.83	9.84	-147	38
		2	0.100	0.31	0.05	0.04			24.01	0.00	0.00	0.00	24.09	12.32	-125	39
		3	0.010	0.20	0.33	0.89			20.08	0.31	0.52	0.00	20.56	7.82	67	50
		4	0.010	0.24	0.28	0.98			21.01	0.56	0.48	0.00	21.55	8.79	4	52
	Cl.15 Ni≦1% Mn2~4% Si≦0.4%	5	0.013	0.18	0.31	3.01			18.95	0.51	0.51	0.00	19.42	8.08	107	45
		6	0.012	0.23	0.33	2.89			19.83	0.51	0.52	0.00	20.31	9.17	66	52
		7	0.011	0.26	0.33	2.98			21.08	0.48	0.49	0.00	21.58	10.38	-4	52
		8	0.010	0.30	0.30	3.00			22.10	0.49	0.51	0.00	22.55	11.53	-62	38
		9	0.018	0.29	0.55	3.03			18.02	0.50	0.53	0.00	19.85	8.78	89	48
		10	0.018	0.23	0.54	3.03			20.11	0.50	0.61	0.00	20.92	9.79	30	60
		11	0.015	0.27	0.61	3.02			21.08	0.49	0.62	0.00	22.00	10.86	-6	55
	Cl.14 Ni≦1% Mn.4~12% Si≦1.2%	12	0.007	0.23	0.35	4.86			19.38	0.47	0.51	0.00	19.91	10.28	68	55
		13	0.008	0.28	0.33	4.89			20.03	0.49	0.50	0.00	20.50	11.27	33	61
		14	0.003	0.28	0.31	4.99			20.53	0.62	0.53	0.00	21.00	12.33	-15	63
		15	0.019	0.24	0.38	4.99			20.31	0.48	0.49	0.00	20.75	10.94	20	59
		16	0.033	0.16	0.34	4.99			18.81	0.48	0.50	0.00	19.32	9.02	105	39
		17	0.035	0.18	0.34	4.92			19.22	0.48	0.49	0.00	19.73	9.53	84	49
		18	0.054	0.23	0.33	4.98			20.03	0.48	0.50	0.00	20.63	11.38	18	58
		19	0.050	0.26	0.34	4.97			21.21	0.46	0.49	0.00	21.72	12.73	-29	48
		20	0.088	0.31	0.35	4.85			22.37	0.46	0.49	0.00	22.90	14.38	-103	41
		21	0.009	0.21	0.33	4.91			20.23	0.46	0.49	0.00	20.73	11.80	25	64
		22	0.110	0.17	0.34	4.91			20.32	0.45	0.49	0.00	20.83	11.80	24	64
		23	0.020	0.42	0.41	4.90			24.01	0.50	0.90	0.00	24.63	16.80	-191	39
		24	0.017	0.26	0.34	4.42			20.43	0.12	2.83	0.00	20.98	11.80	18	71
		25	0.013	0.16	0.33	4.46			21.50	0.38	0.58	0.00	22.00	8.29	11	43
		26	0.019	0.24	0.33	4.49			20.01	0.00	0.00	0.00	20.54	10.91	23	61
		27	0.021	0.24	0.35	4.48			20.03	0.25	0.00	0.00	20.56	10.32	34	62
		28	0.018	0.24	0.35	4.48			19.95	0.00	0.24	3.00	23.48	10.19	33	33
		29	0.030	0.22	0.34	4.49			16.91	0.26	0.34	3.02	20.44	9.32	15	60
	Cl.12 Ni1~3% Mn≦10% Si≦4%	30	0.013	0.18	0.51	3.01			18.89	1.31	0.00	0.00	19.68	9.11	80	48
		31	0.012	0.21	0.51	3.00			20.00	1.48	0.00	0.00	20.77	9.84	45	53
		32	0.010	0.29	0.49	2.98			21.12	1.51	0.00	0.00	21.86	10.20	0	48
		33	0.021	0.26	0.51	2.99			22.03	1.50	0.00	0.00	22.80	11.43	-87	38
		34	0.029	0.19	0.48	2.88			20.03	1.31	2.11	0.00	20.75	9.08	58	58
		35	0.013	0.24	0.31	2.88			17.11	1.50	0.58	3.12	20.70	10.78	9	59
		36	0.020	0.28	0.48	0.98			20.50	2.60	0.00	0.00	21.22	9.38	38	53
	Comp ex.	37	0.029	0.02	0.48	1.32			23.93	4.65	0.00	0.00	24.62	6.66	30	35
		38	0.031	0.02	0.48	1.39			22.51	6.10	0.00	0.00	23.23	8.33	14	33

Comp. ex: Comparative example